

THE RELATIONSHIP BETWEEN
FEEDBACK FROM OBSERVATION AND
TEACHER VERBAL BEHAVIOR IN
PREKINDERGARTEN CLASSROOMS

By
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A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA
December, 1967

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1967

ACKNOWLEDGEMENTS

Considerable assistance and cooperation by others have made it possible for the writer to carry out this study.

The supervisory committee, ably chaired by Dr. C. Glen Hass, has given continuous help and encouragement. Dr. Vynce Hines, Dr. Janet McCracken, and Dr. Caspar Rappenecker served as members of the committee and provided guidance and assistance.

A special note of thanks goes to Dr. Richard Ober. He voluntarily provided the training sessions on interaction analysis and, although not a member of the supervisory committee, contributed much to the study.

Mr. John Neel formulated the computer program and financial support for data processing was made possible by Dr. Ralph Selfridge, Director of the University of Florida Computing Center. Dr. Charles Bridges and Dr. Robert Jester were consulted on statistical matters.

Ultimately, the patience, understanding, and support of family is strongly influential in such an undertaking. The writer thanks his wife, Shirlene, for unfaltering exhibition of these virtues. Two sons and a daughter, Randal, Steven, and Tracy, also deserve grateful mention.

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CHAPTER I

INTRODUCTION

Background

Teachers are almost universally expected to evaluate, revise and improve the program and methods which they follow in their teaching.

Evaluation has numerous meanings and connotations, from a grading or rating to a gathering and use of feedback information. In the context of this study evaluation is used in this latter sense; to describe the gathering and use of information as feedback to assess the effects of program and teaching. This kind of evaluation has been carried out in a variety of ways and one widely used method aimed particularly at self-improvement is careful observation.

Careful observation by the teacher is a technique appropriate for and useful with young children. Observation and subsequent use of information as feedback and to guide next steps can be a powerful force in curriculum planning for the individual teacher. Observation can guide long range plans and influence those teacher micro-behaviors of personal contact and communication. Based in recent history and newly espoused theory by contemporary educational leaders, this means of evaluation currently enjoys both popularity and promise (Gordon, 1966).

Compensatory education

Compensatory education is a movement toward early and/or different educational experience for children with certain disadvantages. In

current literature and in the case of this study, the compensation is to counteract or to make up for disadvantages related to cultural deprivation and poverty.

With an urgency that surprised even the most ardent supporters of the compensatory movement, the idea jumped quickly into practice. Children were sought out and enrolled. Operation Head Start, for example, was initially planned for about 10,000 children. The projection moved quickly to 40,000 but the first year of operation found over 561,000 children involved (Office of Economic Opportunity, 1966). Some of these clients were given short structured language development lessons; others spent most of their school day exploring the community and expanding their background of experience.

The programs of compensatory education are widely varied, based on a broad range of assumption and theory, and operate toward different outcomes. Some have become regular parts of public school operation while others are in pilot or experimental stages.

The Problem

Teachers should evaluate and revise their program of instruction and their behavior for continual improvement. But in practice such evaluation as feedback and guide is seldom utilized in any systematic manner. The problem of this study, in question form is: What changes in teacher behavior, as indicated by verbal interaction patterns measured by the Reciprocal Modification of the Flanders System of Interaction Analysis (Ober, 1967), will result when teachers use a variety of observational techniques to gather feedback information in their classrooms?

Purpose of the study

Observational techniques were used by teachers in a program of compensatory education for young disadvantaged children. Teachers were instructed in the use of several observational techniques. The aim of this procedure was to facilitate systematic assessment as feedback among teachers and then examine certain verbal interaction patterns in the classroom as indicators of change in teacher behavior.

Details

Variables

The independent variables in the present study are the observational techniques (See Appendix A) used by teachers. The dependent variables, the criteria by which change was examined, are the verbal interaction patterns of the teachers as measured by the Reciprocal Modification of the Flanders System of Interaction Analysis. Those verbal interaction patterns are:

1. The Indirect-Direct Ratio
2. The Revised Indirect-Direct Ratio
3. The Student-Teacher Ratio

Hypotheses

The prime hypothesis of the present study is: Teachers who use a variety of observational techniques for obtaining feedback with respect to instruction in their classroom will change from pretest to posttest in terms of the following verbal interaction patterns as measured by the Reciprocal Modification of the Flanders System of Interaction Analysis:

1. The Indirect-Direct Ratio, categories 1,2,3,4,5, categories 6,7,8,9, will increase between pretest and posttest.
2. The Revised Indirect-Direct Ratio, categories 1,2,3, categories 7,8,9, will increase between pretest and posttest.
3. The Student-Teacher Ratio, categories 11,12,13,14,15,16,17,18,19, categories 1, 2, 3, 4, 5, 6, 7, 8, 9, will increase between pretest and posttest.

Figure 1 on page 5 presents the category descriptions.

Significance and expectations

Teachers faced with a group of young children from disadvantaged backgrounds know very little about these children as a group. There is little precedent, theory, research, or successful practice available as a guide. Any curriculum guide, method of instruction, or way of behaving must be considered tentative by the teachers as better guides, methods, and behaviors are sought.

If teachers engage in a systematic program of careful observation, they will learn more about their charges. They will further learn more about the effects of the program presented upon the children. And as feedback information is gathered and studied teachers are likely to adjust their program and their behavior accordingly. Changes in verbal interaction patterns in the classroom will indicate such changes.

Another outcome of the present study is a battery of observational methods for use in classrooms with young children. These methods, whether modifications of research instruments or original, may have value in teacher preparation and inservice programs.

1	<u>ACCEPTS FEELING</u> : accepts and clarifies the feeling tone of another in a friendly manner.	11
2	<u>PRAISES, ENCOURAGES, OR ACCEPTS</u> : praises or encourages the action, behavior, recitation, comments, ideas, etc. of another. Jokes that release tension not at the expense of another individual. Nodding the head or saying "uh-huh" or "go on" are included. Repeats answer or statement of another.	12
3	<u>USES IDEAS OF ANOTHER</u> : clarifying, building on, developing, and accepting the action, behavior, and ideas of another.	13
4	<u>ASKS QUESTIONS</u> : asking a question about the content (subject matter) or procedure with the intent that another should answer.	14
5	<u>ANSWERS THE QUESTIONS OF ANOTHER</u> : giving direct answers to questions regarding content or procedures that are asked by another.	15

6	<u>SELF-INITIATED INFORMATION GIVING</u> : giving facts, information, or opinions about content or procedure. Expressing ones own ideas. Asking rhetorical questions (not intended to be answered).	16
7	<u>GIVES DIRECTIONS</u> : directions, commands, or orders to which another is expected to comply.	17
8	<u>CORRECTIVE FEEDBACK</u> : telling another that his answer is wrong when the correctness of his answer can be established by other than opinion (i.e., empirical validation, definition, or custom).	18
9	<u>CRITICIZES ANOTHER OR JUSTIFIES AUTHORITY</u> : statements intended to change the behavior of another from a non-acceptable to an acceptable pattern; bawling out someone; stating why a person is doing what he is doing so as to gain the opinion or judgment of another.	19

0	<u>SILENCE OR CONFUSION</u> : pauses, short periods of silence, and periods of confusion in which communication cannot be understood by an observer.	0
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Category numbers assigned to Teacher Talk when used in classroom situation: 1 - 9.

Category numbers assigned to Student Talk when used in classroom situation: 11 - 19.

Fig. 1.--Description of Reciprocal Categories for a Modification of the Flanders System of Interaction Analysis.

The setting

In Atlanta, Georgia, eight classrooms were in operation during 1966-1967 serving disadvantaged children prior to their entrance into kindergarten the following school year. The program was called the Atlanta Prekindergarten Project. This project was sponsored under Title I of the Elementary and Secondary Education Act and the Atlanta Public Schools Educational Improvement Project.

The children in the program fit the broad description of "disadvantaged" and were between four and five years old. The term "disadvantaged" here denotes children from urban slums and low (under \$3,000 annual income) income families. They were in the school setting about four hours per day, five days per week from October through July. There were twenty-four staff members, all in teaching roles. Three of these adults were responsible for between fourteen and twenty children in each classroom.

The plan

The teachers in the Atlanta Prekindergarten Project expressed a desire for evaluative methods to assess program effects and changes in child behavior. After a review of the literature, this investigator found and/or developed a variety of observational schemes and instructed the staff in the use of these techniques. The areas under evaluation included:

1. the extent and degree of student participation
2. individual affective or coping behaviors
3. sense of self
4. cognitive style indicators

Before and after the use of observational assessment as feedback, data were collected on classroom verbal interaction patterns. Changes in these interaction patterns were examined. The Reciprocal Modification of the Flanders System of Interaction Analysis was used in this phase, taken from audio tapes of class discussions. The total time period of the study was approximately four and one-half months between February and June, 1967.

Definitions

Verbal Interaction - Teacher talk and student talk which is audible under classroom conditions.

Flanders System of Interaction Analysis - A formal system for categorizing and describing verbal behavior.

Indirect-Direct Ratio - A mathematical expression representing the relationship of indirect teacher talk to direct teacher talk calculated by dividing the total amount of indirect teacher talk by the total amount of direct teacher talk.

Revised Indirect-Direct Ratio - A mathematical expression representing the relationship of positive affective teacher talk to negative affective teacher talk calculated by the total teacher talk in categories 1, 2, and 3 divided by the total teacher talk in categories 7, 8, and 9.

Student-Teacher Ratio - A mathematical expression representing the relationship of student talk to teacher talk calculated by dividing the total amount of student talk by the total amount of teacher talk.

CHAPTER II

PERSPECTIVES FROM THE LITERATURE

This chapter is presented in four parts, identified as:

1. Observation for feedback
2. Compensatory education
3. The observational techniques
4. Development and modification of the Flanders System of Interaction Analysis.

Observation for feedback

One part of the theoretical base from which this study has developed comes from Gordon's "transactional" model of human relationships (Gordon, 1966). Behavior can be understood only in terms of the situation between people as it exists, according to this theoretical formulation. The transaction between a child and his environment can modify outputs which have been seen as fixed in other views. Intelligence, social-emotional behavior, motor skills, and other outputs are examples of modifiable characteristics (Gordon, 1968, in preparation). Further, if behavior is to be understood it must be studied in a situational context.

For the teacher, this position reduces the strength of predispositions and requires flexibility. Situational sensitivity is needed, and guidance of teacher behavior comes from feedback. A segment of that feedback comes from careful observation of children in the classroom.

Another part of the foundation underlying the present study, similar but not congruent with the transactional position, deals directly with teaching. Combs has stated that the most accurate perceptions about children and their behavior are necessary for teachers to behave effectively. What a teacher believes about the students will strongly influence his behavior toward them (Combs, 1965). Accurate perceptions of the children in the classroom, accumulated through observation, should become the content and basis for planning the next teaching encounter.

Concern for the problem of the match between the child's predisposed schema and the circumstance or task of instruction (Hunt, 1962) has also contributed to the background of this study. Observation by the teacher is an immediate and direct way to identify unique behavioral inclinations and assess changes. As inclinations are identified and with plans clearly in view, it is the professional responsibility of the teacher to make decisions and to intervene when necessary. Those in helping relationships to teachers can facilitate this study of children by providing ". . . analytic tools for studying the total classroom interaction . . ." (Gordon, 1966, p. 6).

Studying children has not been a common practice among teachers in the past. Waetjen reviewed Hughes' work with the "Provo Code Assessment Measure," Bellack's study of verbal events in high school classes, Flanders' research of teacher influence, and Perkins' examination of teacher and student behavior. The generalization drawn by Waetjen from these and other recurring patterns of research is:

Teachers, regardless of grade level, subject taught, or supervisor's ratings, make very little use of pupil behavior in helping to develop curriculum content (Waetjen, 1966, p. 29).

It follows that, in view of the lack of feedback use, teachers should use evaluation to guide teaching. Smilanski, in a series of suggestions for pilot programs of compensatory education, has clearly stated the need for evaluation through feedback:

Methodology and didactics should include a process of continuing diagnostic evaluation such that the teacher can know what is actually happening in the learning of given children and can provide what can be actually used by each child in his progression. Without such evaluation, much teaching can be wasted and some can even be harmful in expecting the child to do what he cannot do (Smilanski, 1964, p. 19).

The 1967 Yearbook of the Association for Supervision and Curriculum Development succinctly states the position held in the present study on the function of evaluation:

It (the Yearbook Committee) shares a deep conviction that the purpose of evaluation is to provide feedback and guidance to the whole educational process at every level (Wilhelms, 1967, p. vii).

Evaluation and assessment through observation and study of the children in classrooms becomes a sine qua non for teachers as they plan their work with the children (Suchman, 1959). Change in the teachers themselves is also to be expected as they systematically observe children (Almy, 1959).

Taba moves this concept to bear directly on the program under study:

A careful diagnosis of the emotional condition and the cognitive styles of deviate (culturally deprived) children is necessary for effective program building . . . (Taba, 1964, p. 156).

Compensatory education

Children described as "disadvantaged" are products of low economic status, low educational achievement, tenuous or no employment, limited

community participation, and limited potential for upward mobility. These factors appear to produce disadvantages such as a lack of auditory stimulation and visual discrimination, reduced tactile development, etc. (Deutsch, 1963). There are deficiencies in learning skills, language development, inter-personal relationships and a host of others.

But the findings and descriptions do not become a source of prescriptive ideas for teaching. They serve just to accentuate what is not known about "disadvantaged" children and how to teach them (Jones, 1967). The literature contains an impressive array of research on the success of particular instructional means with particular groups of children (Bloom, Davis, and Hess, 1965). But the absence of instructional theories which might guide teachers has contributed to the failure of schools to reach and teach the "disadvantaged" (Taba and Elkins, 1966).

The need for teachers to be sensitive to differences, especially among "disadvantaged" children is great, and a variety of learning opportunities should be presented (Riessman, 1964). The projections set forth in a recent Review of Educational Research (Karp and Sigel, 1965) suggest that programs for the "disadvantaged" must be related to the level and style of the particular child. Tests and trained observation are seen with new power and diagnostic significance in this regard.

Major emphasis in school programs for these children ". . . should be on diagnostic and prescriptive techniques which give guidance to the instructional team for corrective purposes" (Bloom, 1964). The present study was founded on just such a premise.

The observational techniques

Feedback Form #1, developed in cooperation with the supervisors of the program, is essentially an introduction to observation. It was intended to provide feedback on materials and molar information on particular lessons or activities.

Feedback Form #2 is an adaptation of the Coping Analysis Schedule developed at Duke University (Spaulding, 1966). The categories were selected and used in observing certain young children in school settings. The data were reported as percentages of time spent in each category and eventually used to prescribe reinforcement schedules. In the present study, this observational system was used to make three judgments about the behavior of each child during an activity. The results are graphic; the number of tallies in any category column reveals the prevailing class behavior and individual behaviors are also evident.

A third series of techniques, on self-concept indicators, was gleaned from research studies (Ames, 1952) (Wattenburg and Clifford, 1964) (Weyerowitz, 1962) and modified for use in the classrooms under study.

The fourth method was planned and written to gather information on intellectual development. Cognitive style was selected for specific examination. This technique was derived from research on analytic and nonanalytic patterns of behavior (Kagan, Moss, and Sigel, 1963). Teachers are to decide on the style most appropriate to the planned activity, and then make a judgment about the behavior of particular children.

Development and use of the Flanders System of Interaction Analysis

Historically, several predecessors deserve mention as they have influenced the present Flanders System.

Research on social climate and the classroom personality of teachers stimulated Withall to examine the social-emotional climate in classrooms (Withall, 1949). Seven categories were chosen and classroom interaction was studied using typescripts of classroom episodes taken from recordings. Withall concluded that climate can be assessed, that teacher verbal behavior is a valid measure of climate in classrooms, and that verbal behavior patterns vary among teachers.

Flanders trained teachers to interact with children according to Withall's category grouping (Flanders, 1951). Inter-personal anxiety of students was measured and found to be related to types of teacher behavior.

The behavior categories used in these and other studies (Perkins, 1951) (Thelen, 1951) resemble or appear to be derived from the work of Anderson and others (Anderson, 1939, 1943, 1946a, 1946b). Teacher behaviors were classified as "dominative" and "integrative" contacts with children. These behaviors were found to be prevalent in all classrooms, pointing up the major influence of the teacher. Dominative or direct patterns of teacher behavior usually resulted in dominative student behavior and integrative or indirect teacher contacts nurtured integrative student behavior. The ratio between integrative and dominative teacher behavior was used in these studies and a comparable ratio is in evidence in those mentioned above and in the Flanders System of Interaction Analysis.

Interaction Process Analysis was published (Bales, 1950) and added the dimension of definite and proportional time intervals to systematic observation of interaction. Flanders synthesized the research during 1955, 1956, and 1957 and the operational and mechanical aspects of his system were devised and tested. These studies, conducted in Minnesota and New Zealand, are described in Teacher Influence, Pupil Attitudes, and Achievement (Flanders, 1965).

The Flanders System of Interaction Analysis is considered one of the most sophisticated techniques for examining classroom climate (Medley and Mitzel, 1963). Originally, the following ten categories were used.

1. ACCEPTS FEELING: accepts and clarifies the tone of feeling of the students in an unthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
2. PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, but not at the expense of another individual, nodding head or saying "um hm" or "go on" are included.
3. ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building, or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to category 5.
4. ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer.
5. LECTURING: giving facts or opinions about content or procedure; expressing his own ideas, asking rhetorical questions.
6. GIVING DIRECTIONS: directions, commands, or orders which students are expected to comply with.
7. CRITICIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from unacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
8. STUDENT TALK - RESPONSE: talk by students in response to teacher. Teacher initiates the contact or solicits student statement.
9. STUDENT TALK - INITIATION: talk initiated by students. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk.
10. SILENCE OR CONFUSION: pause, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

Verbal behavior in the classroom is categorized at the end of each three-second period, using the categories of teacher and student talk. The category number is written on paper during the observation, yielding a list of numerals which represent the verbal behavior. Samples of between ten and twenty-five minutes of class discussion are categorized

in this manner. The ratios, such as between "indirect" and "direct" teacher talk are computed by counting the number of tallies per category and comparing those in the specified category groups. For a more detailed treatment of the basic Flanders system, refer to The Role of the Teacher in the Classroom (Amidon and Flanders, 1963) and Teacher Influence, Pupil Attitudes, and Achievement (Flanders, 1965).

Extensive work with the Flanders System has been done at the Ohio State University and has resulted in modifications of the original form. Three additional categories, planned to increase the sensitivity of the instrument, were added (Hough and Associates, 1965) and used in research (Ober, 1966). The additional categories were actually divisions of Flanders' categories 5, 7, and 9. A study was also conducted at the Ohio State University utilizing a modification with sixteen categories (Hough, 1965).

The categories were again shortened to ten but made reciprocal in 1967 (Ober, 1967). This form is quite similar to Flanders' original instrument, except that each category can be used for either teacher talk or student talk. Digits 1 - 9 are used to denote teacher talk while digits 11 - 19 are assigned to student talk. The categories for teacher talk and student talk of the Reciprocal Modification of the Flanders System of Interaction Analysis are shown in figure 1 on page 5.

Flanders has stated that there is no scale in the category system, only a classification scheme (Flanders, 1965, p. 20). Value judgments are not implied, but made when comparing the goals of the episode with the interaction patterns. Reliability of the Flanders System between trained observers has been found to range between 0.70 and 0.85.

CHAPTER III

DESIGN OF THE STUDY

Design

Essentially, this study followed design number two in Campbell and Stanley's chapter on research design in Gage's Handbook of Research on Teaching (Campbell and Stanley, 1963, pp. 171-246). Design number two is called a "one-group pretest-posttest" design.

Audio tapes of classroom discussion were collected on three separate occasions prior to the instruction treatment in observational techniques. The instruction continued periodically over a period of about three months. Tapes were made on three separate occasions again near the end of the program, after the conclusion of the instructional period. Presentation and analysis of the data from the tapes generally follows the methods used by Flanders and others as outlined in Teacher Influence, Pupil Attitudes, and Achievement (Flanders, 1965).

This research design was chosen because, as a pilot program, the compensatory education classes described are unique. There were no other programs considered comparable and the one-group pretest-posttest plan required no controls. The expectation of change over time as teachers use feedback is also a factor which made this design appropriate.

There are limitations on the use of this design and attempts were made to control some of the potentially rival hypotheses inherent in the

use of one pretest and one posttest on one group. Campbell and Stanley caution the researcher about history, maturation, testing, and instrumentation as potential rivals to the central hypotheses. The measures taken to reduce these rival hypotheses are described.

Extraneous variables

History. -- "Between O_1 (pretest) and O_2 (posttest) many other change-producing events may have occurred in addition to the experimenter's X (planned intervention)" (Campbell and Stanley, 1963, p. 177).

The timing of the present study itself was an attempt at control of the extraneous events. The Atlanta Prekindergarten Project began in October and continued through July. The present study was started in February, four months after the beginning of the project. In the early months of the program, lack of clear direction and the confusion of a formative period were evident characteristics. A general curricular framework was then delineated and teachers settled down to a pattern with more routine than disruptive tendencies. Over three months elapsed between the beginning of the program and the pretest. The specialists and supervisors for the program carried out no unusual intervention during the time period of the study.

A second attempt at identification of extraneous variables was undertaken by periodically asking the teachers to report unusual events. Influential events might be an outside speaker, conference attendance, inservice experience, etc. This investigator was a periodic visitor in the classrooms and talked frequently with the supervisors of the program.

Only one event occurred during the time period of the study which might be considered unusual and complicating to the findings. Nine of

the twenty-four teaching staff members visited the Demonstration and Research Center for Early Education (DARCEE Program) at Peabody College in Nashville, Tennessee. This visit was primarily to study the DARCEE program for parent involvement in preschool programs. Teachers reported that the visit had no effect on their day-to-day instruction.

Maturation. -- "This term is used here to cover all of those biological or psychological processes which systematically vary with the passage of time, independent of specific external events" (Campbell and Stanley, 1963, p. 178).

This rival variable is most often a problem in studies where the subjects are children during periods of accelerated biological or psychological growth. With adults, as in the present study, the effect of biological or psychological maturation can be expected to be very slight. The time period of the study also reduces the possible influence of maturation, as detectable change in adults due to biological or psychological maturation over four months is not likely to have influenced the results.

Testing. -- The power of this variable and its effects were reduced by the nature of the method used. Audio tape recordings of teacher-pupil discussions made up the testing device. When episodes were being recorded, only the three teaching staff members and the children were present. The frequent use of tape recorders during regular classroom activities made taping a common and familiar occurrence both to children and teachers. The variety and range of episodes selected for recording is further evidence that the recording had little influence on verbal interaction patterns.

There were possible effects upon the individual teachers as they were aware that the taped session would be analyzed. During pretest and posttest procedure meetings, the quantifying nature of the analysis was stressed and the teaching staff was told that no value judgments or ratings would be made of the process or content of the episodes. Further, the tapes were mailed directly to the investigator by the teachers, eliminating any anxiety about local supervisory interference. The awareness effect can be expected to be minimal and constant during both pretest and posttest.

Instrumentation. -- This extraneous rival hypothesis refers to changes in the measuring instrument which might account for differences between pretest and posttest.

The Reciprocal Modification of the Flanders System of Interaction Analysis was used by the investigator in the present study. The suggested formal training in the use of the system, using Flanders's training tapes, was taken to standardize and reduce variability. During the training and analysis, comparison of results with those of a qualified professional who is experienced in the use of the system made for further standardization.

The tapes were analyzed without reference to time of taping or school or teacher. They were coded and then mixed so as to eliminate sets in the analysis which might develop between pretest and posttest.

Pretest Procedure

After several meetings with the Coordinator of Elementary Education for the Atlanta Public Schools and her staff of Early Childhood Education Specialists, a time was set when all staff members in the prekindergarten program would meet. This investigator was introduced to the teaching

staff at that time and explained the study. It was agreed that the teaching staff would cooperate in data collection and the instructional phase of the study.

The investigator visited several of the classrooms used in the study to establish rapport with the teachers and to identify possible problems in data collection procedures. One of the teachers was asked to participate in a pilot exercise of data collection. She planned an activity and engaged in discussion with the children. A second teacher operated the tape recorder and handled the microphone.

Following this pilot tape, the investigator analyzed the tape according to procedure already outlined and found that further collection of data by this method was feasible and desirable for the study.

At a second meeting of the teaching staff the procedures for collecting the pretest audio tapes was outlined. Each member of the teaching staff in each of the eight classrooms was asked to record three episodes of teacher-student discussion, making a total of seventy-two episodes. The episodes could range from between seven and twenty minutes in length each, and were to be collected on three separate occasions over a period of two weeks. At least one school day should separate each episode.

Based on the experience with the pilot tape, a team approach to the taping was urged. One staff member was to conduct the discussion while another operated the tape recorder, and this cooperation was then reversed when another staff member talked with the children.

The content and nature of the discussion was left to the discretion of the individual staff members. The only criterion for selection of episodes was that the teacher and children be engaged in discussion. The episodes selected all met this criterion and ranged from carefully

planned lessons on community helpers to casual discussion during lunch. Other examples of episodes were "happy gathering" sessions, reviews of field trips, language development activities, discussion of a story, etc.

Each school unit was given address labels and stamps so that the completed tapes could be mailed directly to the investigator. Replacement tapes were supplied by the investigator to take the place of those used in the pretesting.

Instructional Procedure

Introduction to observational techniques and instruction in the use of those selected for the present study began two weeks after the completion of pretesting. All teaching staff members plus the several Early Childhood Education Specialists had one afternoon per week specially designated for meetings. These meetings took place in conference rooms of the Instructional Service Center of the Atlanta Public Schools (2930 Forest Hill Drive, S. W., Atlanta, Georgia). The investigator took part in ten of the afternoon meetings. The first two were devoted to pretest procedures, and the last to posttest procedures.

At the first meeting related to the observational techniques, the role of observation in curriculum planning and instructional decision making was discussed. Concerns of the teachers revolved around a desire to learn how to measure the effects their instructional program would have on the children involved. They were seeking ways of assessment and evaluation, and Feedback Form #1 grew out of this first meeting.

The meetings which followed included a review of previous discussions, questions and answers concerning use of techniques being used, and introduction of the next technique. The investigator acted in the role of a consultant in these meetings.

Concurrent with these meetings, the investigator visited each of the classrooms at least twice. These visits were made as a passive observer and also to answer questions regarding the observational techniques on an individual basis.

Throughout the time period devoted to instruction in the use of the observational techniques, an attempt was made on the part of the investigator to minimize coercion and maximize cooperative participation. Where a technique proved to be difficult to follow or require too much time, revision was made. For example, the observations originally suggested on Feedback Form #2 were shortened to coincide with the average length of a particular lesson or activity. It is entirely possible that some of the teachers participated in the program because they thought it was expected of them, however every attempt to eliminate such misconceptions was made. Their voluntary participation was emphasized throughout, and this was also stressed to their supervisors.

Posttest Procedure

Five weeks after the last instructional meeting with the teaching staff the procedure for making the posttest tapes was discussed. The procedure and criterion for selection of episodes to record was the same as followed in the pretest directions.

Observer Reliability

The Scott method of estimating reliability (Scott, 1955), both between observers and over time for the same observer, was selected and used in the present study. Flanders found this to be the most useful

method (Flanders, 1965) because it is relatively unaffected by low frequencies, can be adapted for percentage figures, and is more sensitive at higher levels of reliability.

In preparation for analysis of the taped discussions used in this study the investigator participated in a training session on interaction analysis. This session, conducted by a University of Florida faculty member with considerable experience in both Flanders' original category system and later modifications, consisted of approximately fourteen contact hours. The majority of this time was spent analyzing recorded tapes and discussing differences in interpretation. Checks on inter-observer reliability and intra-observer reliability were also made.

The original proposal for the present study set forth the investigator as the only observer, subject to reported reliability of between 0.65 and 0.80. Flanders, using trained observers, reported inter-observer reliability of approximately 0.85 (Flanders, 1965). Inter-observer reliability for the investigator in the present study was established by comparing the results of his analysis of given tapes with the faculty member and other participants in the training session. Checks were also made on the pretest and posttest tapes used in the study, comparing the investigator's results with those of others trained in the use of the system. The reliability coefficients were 0.76, 0.79, and 0.90. Using Fisher's Z transformation, a mean of 0.84 was established. (The highest agreement, 0.90 was between the investigator and the "expert" faculty member.)

Intra-observer reliability reflects agreement on the same recorded episode when analyzed at different times. The coefficients reported here were also established during the training session and using pretest and posttest tapes from the present study. At least one week separated

the analysis of the same tape. The intra-observer reliability coefficients were 0.71, 0.87, and 0.89. Using Fisher's Z transformation, a mean of 0.83 was established. Since these reliability coefficients satisfied the condition noted in the original proposal, the investigator was the only observer for all of the episodes in the present study.

The Scott coefficient is calculated as follows:

$$P_i = \frac{P_o - P_e}{100 - P_e}$$

P_o is the proportion of agreement with a standard which is established by subtracting the total percentage of disagreement from 100 per cent.

P_e is a correction factor for agreement by chance and is found by squaring the percentage figures of the two categories with the largest number of tallies. These two squares are then added to yield P_e .

CHAPTER IV

ANALYSIS OF THE DATA

This chapter includes an examination and analysis of the information gathered from the pretest and posttest audio tapes of verbal interaction in the classroom situation. The categorization of teacher and student talk, using the Reciprocal Modification of the Flanders System of Interaction Analysis, is described. Analysis of these data, with appropriate tables and figures, is followed by a reporting of the results of the present study.

Hypotheses

At the beginning of this study, the main hypothesis and specific subhypotheses were stated: Teachers who use a variety of observational techniques for obtaining feedback with respect to instruction in their classroom will change from pretest to posttest in terms of the following verbal interaction patterns as measured by the Reciprocal Modification of the Flanders System of Interaction Analysis:

1. The Indirect-Direct Ratio, categories 1,2,3,4,5, will increase between pretest and posttest.
categories 6,7,8,9
2. The Revised Indirect-Direct Ratio, categories 1,2,3, will increase between pretest and posttest.
categories 7,8,9
3. The Student-Teacher Ratio, categories 11,12,13,14,15,16,17,18,19, will increase between pretest and posttest.
categories 1, 2, 3, 4, 5, 6, 7, 8, 9

Figure 2 on page 27 presents the category descriptions. For the remainder of this report, the following symbols will be used to represent the ratios:

1. Indirect-Direct - I/D
2. Revised Indirect-Direct - II/DD
3. Student-Teacher - S/T

Interaction analysis

An analogy has been made (Ober, 1965) between interaction analysis in education and a movie camera in sports. The general process of interaction analysis (The Reciprocal Modification of the Flanders System of Interaction Analysis is one of several specific types.) enables the user to record and preserve an instructional event in much the same way that a movie camera enables the user to record and preserve a sporting event. Interaction analysis is also suitable to a quantification of the instructional event, yielding data that can be subjected to statistical analysis.

The central procedure used is for the observer to categorize teacher and student talk, every three seconds, into one of the predetermined categories. The Reciprocal Modification of the Flanders System of Interaction Analysis used in the present study has nine categories for teacher talk, nine categories for student talk, and one category for silence or confusion when no talk can be discerned. All verbal interplay in the classroom during a particular episode is classified and placed into one of the nineteen categories. The three second interval allows the talk in each category to be expressed as a percentage of the total, so that the percentages can be compared between pretest and posttest.

1	<u>ACCEPTS FEELING:</u> accepts and clarifies the feeling tone of another in a friendly manner.	11
2	<u>PRAISES, ENCOURAGES, OR ACCEPTS:</u> praises or encourages the action, behavior, recitation, comments, ideas, etc. of another. Jokes that release tension not at the expense of another individual. Nodding the head or saying "uh-huh" or "go on" are included. Repeats answer or statement of another.	12
3	<u>USES IDEAS OF ANOTHER:</u> clarifying, building on, developing, and accepting the action, behavior, and ideas of another.	13
4	<u>ASKS QUESTIONS:</u> asking a question about the content (subject matter) or procedure with the intent that another should answer.	14
5	<u>ANSWERS THE QUESTIONS OF ANOTHER:</u> giving direct answers to questions regarding content or procedures that are asked by another.	15

6	<u>SELF-INITIATED INFORMATION GIVING:</u> giving facts, information, or opinions about content or procedure. Expressing ones own ideas. Asking rhetorical questions (not intended to be answered).	16
7	<u>GIVES DIRECTIONS:</u> directions, commands, or orders to which another is expected to comply.	17
8	<u>CORRECTIVE FEEDBACK:</u> telling another that his answer is wrong when the correctness of his answer can be established by other than opinion (i.e., empirical validation, definition, or custom).	18
9	<u>CRITICIZES ANOTHER OR JUSTIFIES AUTHORITY:</u> statements intended to change the behavior of another from a non-acceptable to an acceptable pattern; bawling out someone; stating why a person is doing what he is doing so as to gain the opinion or judgment of another.	19

0	<u>SILENCE OR CONFUSION:</u> pauses, short periods of silence, and periods of confusion in which communication cannot be understood by an observer.	0
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Category numbers assigned to Teacher Talk when used in classroom situation: 1 - 9.

Category numbers assigned to Student Talk when used in classroom situation: 11 - 19.

Fig. 2.--Description of Reciprocal Categories for a Modification of the Flanders System of Interaction Analysis.

Audio tape recordings of classroom discussions between teacher and students provided the raw data for the study. A total of six episodes were recorded by each of the subjects; three as pretest before intervention and three as posttest. Each episode was between seven and fourteen minutes in length and in most cases constituted a particular "lesson" or experience from beginning to end.

The raw data for each episode were in the form of a series of numerals, each representing a category for a given three second period. A sample of these raw data, with brief comment regarding the category, is presented in Figure 3. This sample represents one minute of verbal interaction.

The next step following this categorization was to transfer the series of numerals to IBM cards. The three episodes for each subject were combined during this step, so that the pretest IBM cards for each subject became a composite of the three recordings. In this way, the three samples of a subject's verbal interaction patterns were merged into one representation for that subject. The punching and verification of the IBM cards was done at the University of Florida Computing Center.

While the raw data were being transferred to the IBM cards, a computer program was written to provide for the computations required. For each subject, the raw pretest and posttest data were used in the following calculations.

1. All tallies in a given category were summed, yielding the total number of tallies in each of the categories. For example, a given subject may have had 65 tallies in category 4 from pretest data.
2. The number of tallies in each category (for each subject and by pretest and posttest) was divided by the total number of tallies for all categories, yielding a percentage. For example, a given subject may have spent 24.51 per cent of the total asking question (category 4) from pretest data.

- 4 (teacher asks question)
- 15 (student answers question)
- 2 (teacher accepts or praises answer)
- 6 (teacher gives information, lectures)
- 6 (teacher gives information, lectures)
- 7 (teacher gives directions)
- 14 (student asks question)
- 5 (teacher answers question)
- 0 (silence)
- 7 (teacher gives directions)
- 16 (student gives information)
- 16 (student gives information)
- 4 (teacher asks question)
- 15 (student answers question)
- 8 (teacher tells student answer is wrong)
- 15 (student answers question)
- 2 (teacher accepts or praises answer)
- 2 (teacher accepts or praises answer)
- 3 (teacher uses or clarifies idea of another)
- 6 (teacher gives information, lectures)

Fig. 3.--Sample of Raw Data and Category Comment

3. The percentage of total time spent in each of the categories was then used to compute the ratios (I/D, II/DD, and S/T) for comparison between pretest and posttest.

Statistical treatment

Following the intermediate data analysis and computations which produced the I/D, II/DD, and S/T ratios it remained to examine the change (if any) in these ratios between pretest and posttest.

First, the directional difference between pretest and posttest was computed for each ratio by subject. These differences, for each ratio, were summed. The differences were also squared and these squares summed. Table 1 presents the results of these calculations for the I/D ratio, table 2 for the II/DD ratio, and table 3 for the S/T ratio.

To test for the significance of change over time, a t test was used. Since the original three hypotheses were stated such that an increase was expected, the one-tailed t test was the appropriate form. Table 4 shows the t test analysis for the group on change in I/D ratios, II/DD ratios, and S/T ratios.

Discussion

The change over time for the I/D ratio, as indicated by the differences between pretest and posttest, was found to be significant at the .01 level. Since the differences between pretest ratios and posttest ratios were found by subtracting pretest from posttest, the mean of the differences showed an increase in the I/D ratio for the group. This finding supports subhypothesis number one of the present study; that the I/D ratio will increase between pretest and posttest.

TABLE 1

THE I/D RATIO; PRETEST, POSTTEST, DIFFERENCE, SQUARED DIFFERENCE, AND SUMS

Subject	Pretest Ratio	Posttest Ratio	Difference	Difference Squared
A	1.2928	11.7692	10.4764	109.7750
B	1.5284	10.0455	8.5171	72.5410
C	0.3546	2.2727	1.9181	3.6791
D	2.3893	3.6364	1.2471	1.5552
E	0.6751	1.7167	1.0416	1.0849
F	0.7264	1.3293	0.5669	0.3214
G	1.7719	3.4925	1.7206	2.9604
H	2.4242	3.8070	1.3828	1.9121
I	3.3699	4.2553	0.8854	0.7839
J	1.1714	3.6250	2.4536	6.0201
K	1.5513	3.0698	1.5185	2.3058
L	1.8739	4.1556	2.2817	5.2061
M	1.5229	1.8140	0.2911	0.0847
N	0.7912	1.4409	0.6497	0.4221
O	1.9241	2.0857	0.1616	0.0261
P	2.1909	4.9412	2.7503	7.5641
Q	5.1754	4.5833	-0.5921	0.3506
R	6.3250	4.7571	-1.5679	2.4583
S	1.0071	2.0796	1.0725	1.1503
Total	----	----	36.7750	220.1811

TABLE 2

THE II/DD RATIO; PRETEST, POSTTEST, DIFFERENCE, SQUARED DIFFERENCE, AND SUMS

Subject	Pretest Ratio	Posttest Ratio	Difference	Difference Squared
A	45.0000	19.0000	- 26.0000	676.0000
B	52.3333	32.0000	- 20.3333	413.3089
C	53.0000	10.1667	- 42.8333	1,834.6919
D	6.0952	4.0741	- 2.0211	4.0848
E	3.7917	9.2000	5.4083	29.2497
F	6.8750	7.4286	0.5536	0.3065
G	3.1250	3.0909	- 0.0341	0.0012
H	5.8750	3.7083	- 2.1667	4.6945
I	5.0000	5.0667	0.0667	0.0044
J	5.5000	4.9091	- 0.5909	0.3491
K	10.6364	4.6000	- 10.1764	103.5591
L	1.9630	5.1667	3.2037	10.2637
M	5.4783	1.7027	- 3.7756	14.2551
N	2.1429	2.2000	0.0571	0.0033
O	17.8000	6.4545	- 11.3455	128.7203
P	1.6923	5.4615	3.7592	14.1316
Q	5.3333	8.5000	3.1667	10.6713
R	6.3750	6.4211	0.0461	0.0021
S	2.9333	0.5125	- 2.4208	5.8603
Total	----	----	-105.5258	3,259.0706

TABLE 3

THE S/T RATIO; PRETEST, POSTTEST, DIFFERENCE, SQUARED DIFFERENCE, AND SUMS

Subject	Pretest Ratio	Posttest Ratio	Difference	Difference Squared
A	0.4637	0.9398	0.4761	0.2267
B	0.4022	0.5267	0.1245	0.0155
C	0.2072	0.7222	0.5150	0.2652
D	0.8041	0.5686	-0.2355	0.0544
E	0.4802	0.6319	0.1517	0.0230
F	0.5983	0.5864	-0.0119	0.0001
G	0.5190	0.6711	0.1521	0.0231
H	0.5428	0.7299	0.1871	0.0350
I	0.6332	0.8016	0.1684	0.0283
J	0.3914	0.5946	0.2032	0.0413
K	0.4824	0.5429	0.0605	0.0037
L	0.6364	0.6336	-0.0028	0.0000
M	0.3627	0.4132	0.0505	0.0025
N	0.3957	0.4846	0.0889	0.0079
O	0.3247	0.7222	0.3975	0.1580
P	0.6353	0.7970	0.1617	0.0261
Q	0.8324	0.9104	0.0780	0.0060
R	0.8191	0.8536	0.0345	0.0012
S	0.4982	0.6106	0.1124	0.0126
Total	-----	-----	2.7119	0.9306

TABLE 4

SUMMARY OF DIFFERENCES BETWEEN PRETEST AND POSTTEST RATIOS

Ratio	Mean of the Differences	Standard Deviation of the Differences	Standard Error of the Differences	t
I/D	1.9355	2.8771	0.660	2.93*
II/DD	-5.5534	12.1655	2.790	-1.98
S/T	0.1427	0.1738	0.398	3.58*

* $p < .01$

The I/D ratio compares those categories (1,2,3,4,5) which have been considered "indirect" with those categories (6,7,8,9) which have been considered "direct." The ratios for the group showed an increase and the result of the change is that teacher talk in the prekindergarten classrooms under study was more indirect than direct after the instructional phase of the study.

The descriptions of categories 1, 2, 3, 4, and 5 range from teacher talk about the feelings of others through praise of behavior to the asking and answering of questions. These "indirect" forms of teacher talk are compared to categories 6, 7, 8, and 9, which are described by such terms as "lecture," "gives direction," and "criticism."

More than half of the nineteen subjects showed negative differences between pretest and posttest on the II/DD ratio. The group showed a mean decrease of differences in this ratio of 5.5534. The t test analysis was not statistically significant. Subhypothesis number two is not supported.

The II/DD ratio was added to the original Flanders System of Interaction Analysis in modifications at the Ohio State University. It compares categories 1, 2, and 3 (considered "positive affective" teacher talk) with

categories 7, 8, and 9 (considered "negative affective" teacher talk). Categories 4, 5, and 6 are not used in the II/DD ratio since they are essentially content-related and considered neutral in terms of their affective nature.

The third ratio under examination in the present study was the S/T ratio which compared the total amount of student talk with the total amount of teacher talk. As with the other ratios, the differences between pretest and posttest were compared. The change over time for the S/T ratio was found to be significant at the .01 level. The change was in the direction of an increase in the ratio from pretest to posttest, supporting subhypothesis number three.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

Review

The purpose of this study was to examine certain changes in teacher verbal behavior before and after the teachers were instructed in the use of observational techniques in their classrooms. The observational techniques were designed to provide systematic feedback to the teacher. The study was an attempt to answer the question: What changes in teacher behavior, as indicated by verbal interaction patterns measured by the Reciprocal Modification of the Flanders System of Interaction Analysis, will result when teachers use a variety of observational techniques to gather feedback information in their classrooms?

Background. -- This problem arose from a concern on the part of the investigator that teachers, especially teachers of young "disadvantaged" children, should constantly improve their own instructional program. Those in a helping relationship to teachers can facilitate this constant improvement by helping teachers gather feedback information. The particular method of gathering feedback information selected for this study was systematic observation by the teachers in the classroom.

The rationale which underlies the position taken in the present study is based on the assumption that teachers can and will improve their own instructional competence. And that improvement can be further aided

by the application of systematic evaluation for feedback and to guide instructional decision-making. This approach does not ignore or reduce the broad range of ways in which teachers have always collected feedback information on their classroom situations. Teacher sensitivity to the ongoing activity is a major force in curriculum planning; this study has been an attempt to systematize observation by the teacher as one aspect of teacher sensitivity.

Variables. -- The first step to provide observational techniques for use by teachers in classrooms was to find and/or to develop a set of methods. The areas chosen for observation by the teacher were the degree of involvement, affective or "coping" behaviors, sense of self, and cognitive style. In general, the techniques were category systems or suggestions for recording anecdotal information related to these areas. They were designed to provide graphic results which required no complex analysis, and also planned to be usable under classroom conditions. The observational techniques finally selected and developed (See Appendix A) were presented to the teachers in a series of meetings during the instructional phase of the study.

In order to examine certain changes in teacher verbal behavior which may or may not result from observation for feedback, a search was made for measures of verbal interaction patterns. The Reciprocal Modification of the Flanders System of Interaction Analysis was selected as the instrument for the present study.

Hypotheses. -- The problem of the study was divided into three specific subhypotheses for examination. The particular form of interaction analysis used in this study yields ratios between certain groups of categories. It was hypothesized that the I/D, II/DD, and S/T ratios would increase between pretest and posttest.

Setting. -- The study was carried out in Atlanta, Georgia between February and July of 1967. The Atlanta Prekindergarten Project was the program under study, composed of eight classrooms each staffed by three teachers. This group of twenty-four teachers worked with children from "disadvantaged" backgrounds during the school year before the children would enter kindergarten. Between fourteen and twenty children were in each classroom. Of the original twenty-four teachers, four resigned and left the school system between pretest and posttest. This reduced the group to twenty. One teacher sent only one of the expected three episodes to make up the posttest and this was not considered adequate to represent that teacher. She was also dropped from the study. The data in this report represent a total of nineteen teachers.

Audio tapes were used as pretest and posttest, and these were analyzed to provide the data of the study. Further analysis, through computer calculations and statistical treatment, produced the results reported in chapter 4.

Conclusions

The three specific subhypotheses derived from the original question of this study are again presented here. The conclusion drawn from the analysis and examination of the data for each is also stated.

The I/D ratio. -- Subhypothesis number one stated that the Indirect-Direct Ratio, categories 1, 2, 3, 4, 5, will increase between pretest and categories 6, 7, 8, 9 posttest. Examination of the differences between pretest and posttest I/D ratios for the teachers in the present study showed an increase which was significant at the .01 level. It is therefore concluded that the ratio between indirect teacher verbal behavior and direct verbal behavior

increased. As a group, the teachers in the Atlanta Prekindergarten Project showed a mean increase of the differences of 1.935 between pretest and posttest.

The II/DD ratio. -- Subhypothesis number two stated that the Revised Indirect-Direct Ratio, categories 1, 2, 3, will increase categories 7, 8, 9, between pretest and posttest. Examination of the differences between pretest and posttest II/DD ratios for the teachers in the present study showed a decrease. The decrease was not statistically significant although the mean decrease of differences was 5.554. It is therefore concluded that the ratio between "positive affective" teacher verbal behavior and "negative affective" teacher verbal behavior did not increase.

The S/T ratio. -- Subhypothesis number three stated that the ratio between total student talk and total teacher talk would increase between pretest and posttest. Examination of the differences between pretest and posttest S/T ratios for the teachers in the present study showed an increase which was significant at the .01 level. It is therefore concluded that the ratio between total student talk and total teacher talk increased. The mean of the differences for the teachers in the Atlanta Prekindergarten Project was 0.1427.

The original question. -- A tentative and partial answer to the original question asked in this study can now be formulated from the conclusions. When teachers in the Atlanta Prekindergarten Project used a variety of observational techniques to gather feedback information in their classrooms, their behavior (as indicated by verbal interaction patterns measured by the Reciprocal Modification of the Flanders System

of Interaction Analysis) changed. Specifically, the behavior changes for the group were increases in the I/D ratios and increases in the S/T ratios.

Implications

This report has been primarily concerned with a description of the study and presentation of the findings. It remains for the investigator to make the step from the findings toward theory and practice.

For inservice education. -- In this study, a certain kind of intervention was used to facilitate change in teachers. While it was hypothesized that the change would be directional, no attempt was made during the study to influence the direction. The intervention, in the form of the instructional phase of the study, imposed no value orientations on the teachers. Rather, it was decided to place the responsibility for instructional decision-making within the classroom, and then to provide a systematic procedure of assessment for feedback. At the most, the instructional phase gave the teacher certain tools for gathering information. The subsequent use of that information, both in describing and in guiding next steps, was not controlled or influenced by the study.

An approach like this, if used as an inservice teacher education program, places the directors of the inservice program in a service role. The planners of the inservice program would act as consultants, resource people, and specialists. They would provide a service to the teachers being served; that service being the methods and techniques for gathering feedback information in a systematic manner. The teachers would learn the skills required to gather the information.

After the skills of observation and systematic evaluation are acquired, there are at least two approaches which might be followed.

In the first, as in the present study, the use of feedback information would be strictly a personal matter. The inservice program would not try to influence the direction of change, or even to take the position that change is desirable. It is conceivable that a given teacher, after gathering feedback information on a certain aspect of her instructional program, may decide that the aspect under evaluation is meeting its objectives with great success. The feedback may reinforce the particular practice and the teacher would likely continue doing just what she had been doing.

If the inservice program does not try to influence the translation of feedback into practice, it is entirely possible that subsequent changes may take place which seem to be undesirable. For example, the II/DD ratio change in the present study showed a decrease (although the change was not statistically significant) which would not be considered desirable in most classrooms serving young disadvantaged children. Superficially, it would appear that teachers stressed more direction-giving, correction, and criticism than they stressed the "positive affective" verbal behaviors. This ratio was probably not as sensitive to these modes of verbal behavior as it should have been. However, if certain changes took place where giving directions and correction increased, these teacher verbal behaviors may have been completely appropriate in a given situation. Thus an inservice program patterned after the present study places the responsibility and authority for certain instructional decisions squarely with the teacher. If planners of inservice teacher education would adopt such a program, they must accept and support the resulting decisions and changes as they take place.

A second approach to the use of systematic observation in inservice teacher education might make a concerted effort to influence change in a particular direction. For instance, the self-concept of a young child from an impoverished environment may be less than adequate and a lack of confidence may be limiting his school success. The inservice program would provide assessment methods to the teacher and also provide the teacher with theory, research, and/or practices aimed at increasing the positive perceptions of the child. On a broad scope, a particular school system may begin a program for the identification and help of the partially sighted. Observational techniques for identifying children with visual difficulties would be found and/or developed. Teachers would also learn ways and means of working with these children within their classrooms. Suggestions for practice may parallel or follow the instruction in systematic observation. And as practices are developed and implemented, systematic observation continues as a means of evaluation.

For preservice education. -- The introduction to and instruction in observation as a method of gathering feedback has a place in the preservice education of teachers. It is at this stage of the development of professional educators that the individual seeks "answers" to the hundreds of problems to be faced in the classroom. The preservice education program has a responsibility to provide as many "answers" as possible, but an even larger responsibility to provide ways of finding "answers" after the teacher leaves the college or university. Specific practices and procedures of instruction learned during preservice education programs can be considered tentative, until better practices

and procedures are found. Observation by preservice teachers of children and teachers in classrooms first can become the content of discussion. Then, increasing the skills of the observer in gathering feedback information can become one of the more important services that the preservice program provides.

Many programs include some observation of classrooms in operation by preservice teachers. Some programs and courses go further than just providing the opportunity to observe. At the University of Florida, for instance, preservice teachers have a portion of one of their courses in human development devoted to the systematic observation of children. If part of the preservice education of teachers is spent in providing skills and techniques of observation for feedback, this emphasis is likely to be of more general and long range value than certain solutions to certain situations. Observation for feedback is a way of finding out, and as such should contribute much to the continual improvement of teaching.

For curriculum development. -- There are very few educators who would disregard the interests and needs of the children when planning the program for these children. Just how influential the child should be in the process of curriculum planning will never be definitively decided. But, as a general principle of curriculum planning, the interests and needs of the child must be considered.

Systematic observation by teachers in their classrooms is a promising element of the curriculum planning process. The importance of observation is greatly increased when planning programs for young children, since many of the traditional assessment techniques rely on certain levels of verbal skill and ability to read and write. The

importance of systematic observation is even more important when dealing with programs for young "disadvantaged" children. Theory, research, and practice is even more scarce for this population of children than for other groups. Schools have very little successful practice to fall back on; the failure of schools to engage these children in the process of schooling has served to accentuate the absence of successful practices. Instructional theory for any level or group is either inadequate or fragmentary at this time, so little assistance can come from this source. Research on the characteristics of the "disadvantaged" and evaluations of certain successful programs is beginning to accumulate. But curricular decisions based on any of these three sources are not (and may never be) considered permanent or conclusive. The teacher is responsible for judging the appropriateness of any activity or experience, and systematic observation can be one step in the process of evaluation, revision, and improvement.

Limitations

The implications set forth in the previous section are steps from the findings of the present study toward theory and practice. The findings of this study have contributed to the selection of these implications, but do not necessarily point to an immediate translation of the findings into operational programs. This has been one study with nineteen subjects. There was no similar control group and some potential variables have been difficult or impossible to regulate. The best inference to be made from the findings is that the instructional phase resulted in increases in the I/D and S/T ratios for the group, and that the II/DD ratio did not increase.

Further research

Throughout the planning period and the process of conducting the study many questions have emerged. The present study began as a question; it is fitting that it should end with questions and suggestions for further research.

1. Will other groups of teachers exhibit similar changes in verbal behavior when instructed in systematic observation for feedback?

If the present study were to be replicated, what changes in the I/D, II/DD, and S/T ratios will results? The findings of the present study, if supported by similar findings on other groups of teachers, would have more generalization power.

2. What is the relationship between teacher verbal interaction patterns and learning in the classroom?
3. What is the relationship between teacher verbal interaction patterns and the social-emotional climate in the classroom?
4. What is the relationship between teacher verbal interaction patterns and student interaction patterns?

The Reciprocal Modification of the Flanders System of Interaction Analysis seems to have the potential of providing comparable data for teacher and students.

5. To what extent do teachers employ observational techniques after being instructed in the use of these techniques?
6. What is the optimum level of change that can be facilitated among teachers who use systematic observation for feedback and guide?

7. What conditions are necessary in the classroom for effective use of systematic observation without disrupting or hindering the instructional process? Can systematic observation be used effectively in a classroom where only one teacher works with a group of children?
8. What specialized materials or technical devices would be useful for making and/or recording information from observation?
9. What verbal interaction pattern changes can be found when data from interaction analysis are plotted in matrix form?
10. What changes in program and instructional procedures result when teachers use systematic observation for feedback? What is the relationship between changes in program and changes in verbal interaction patterns?
11. How can inservice teacher education programs best serve the teachers in facilitating systematic observation and evaluation?
12. What changes in preservice teacher education will result in increased diagnostic skills, such as systematic observation?

APPENDICES

APPENDIX A

CLARIFICATION ON THE USE OF THE FEEDBACK FORM #1

The aim of this procedure is to provide an easy yet effective means of evaluation and revision. The judgments are subjective and the teacher's own.

1. In the column marked experience, a brief description of the planned activity is written. Sample description would be:

teacher or aide reading story to children, or children walking the balance beam, or science lesson - safety with electricity - teacher showing and talking with children about electrical outlets.

This section is open so that as you recall or discover experiences related to this objective they can be written on the form, evaluated, and finally shared with others if judged successful.

2. Please indicate the date or dates.
3. Name or briefly describe the materials used. How effective were these materials to the experience and objective? Assign a rating of:

- (0)--materials had little or no value in this exercise, not recommended for use
- (1)--materials were usable in this exercise but left much to be desired
- (2)--materials were fairly effective, easy to use, and appropriate; these materials are adequate, but there are probably others that are better
- (3)--materials were satisfactory and their use in the experience was quite valuable; they are recommended for use
- (4)--materials were excellent and are probably the best materials for this exercise

Where many different materials such as beads, string, sticks, and blocks are used please rate each type. For example:

plastic pop-it beads - (3)
string - (2)

popsicle sticks - (4)
large wooden blocks - (1)

4. During the experience, scan the children at least twice and make some tentative judgment of their involvement in the planned or desired activity. Soon after the particular experience, report how the children were involved for most of the experience.

ACTIVELY INVOLVED means participating in the experience in the desired manner and according to the expectations of the observer as related to the activity as planned.

PASSIVELY INVOLVED means interested and listening or watching but not participating through any overt behavior.

ACTIVELY NOT INVOLVED means doing something other than the desired or expected.

PASSIVELY NOT INVOLVED means that the child is not participating or watching and shows little or no overt activity. He may be "withdrawn," "daydreaming," etc.

5. Finally, the teacher checks the interaction pattern of the experience.

T - C Teacher-child indicates that the teacher (or aide) and the child or group are communicating and interacting. Teacher reading to group, singing songs, and discussion-type activities belong here.

IND. CHILD An experience such as drawing, painting, looking at books, etc., where children are doing things alone and without teacher or other-child interaction.

C - C Child-Child interaction involves two or more children. The teacher is not directing the activity or communicating with the children.

6. Please also initial the observer column after each rating.

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Name of School

Skill:

Objective:

EXPERIENCES

DATE

MATERIALS

NO. OF CHILDREN	
Involved	Not In- volved
Actively	Actively
Passively	Passively

This experience was primarily a:	
I-C	Ind. Child
C-C	2 or more

Observer

DIRECTIONS FOR FEEDBACK FORM #2

This is one way to gather information about individual behavior during particular experiences. An observer uses the form while the activity is underway and does not participate.

- FIRST** Write school name, date, and observer in the upper right.
- SECOND** Describe the experience or activity. Use enough detail so that another person could visualize what was going on. One example might be:

"Language development exercise - teacher holding up cards with letters and asking children to name the letters. The group was very restless and noisy. One aide sat with the children."

"Snack time - children seated at tables in groups of 6. Juice and cookies being distributed by selected children while rest wait at places. Teacher and aides helping children and directing their activity."

(THE NAMES OF THE CHILDREN IN THE CLASS CAN BE WRITTEN DOWN PRIOR TO OBSERVATION)

- THIRD** Beginning with the first child on the list, look at him for about 30 seconds. Then make a judgment as to which behavior of the 12 categories fits best. Place an "x" in the first column of that category for that child and go on to the next child.

After observing each child, sub-total each of the 12 columns.

Then repeat the procedure, this time marking the "x" in the shaded middle column under the appropriate category.

Repeat a third time and mark the total number of "x" marks under each category.

- FOURTH** If there are any comments, descriptions, or remarks that you feel would be helpful about any particular child, write these on the back of the form.

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¹These categories, slightly modified, come from the "Coping Behavior Categories" by Robert L. Spaulding. They were developed as part of the Education Improvement Program at Duke University, Durham, North Carolina.

INDIVIDUAL BEHAVIOR CATEGORIES FOR FEEDBACK FORM #2

I. RESISTING AUTHORITY

Resisting doing what is expected or requested

Verbal resistance - child says, "No, I won't do it."

Physical resistance - child pulls away from teacher, goes to another area.

Delaying tactics

Child acts as if he hasn't heard teacher's directions.

Child just stands there after teacher has suggested some action.

Child continues to work after teacher announces clean up time.

Child tries "Just one more time" after being told to stop doing something.

Defensive checking

Child looks up at teacher after he has done something which he knows is wrong.

II. PHYSICAL WITHDRAWAL OR AVOIDANCE

Moving away from an unpleasant situation, moving physically away from teacher and/or other children to a place where he is inconspicuous.

Avoiding something threatening or unpleasant, such as:

Child may avoid looking at teacher when she is looking for someone to recite or perform.

On the playground, child may remain on the fringe of an activity or move away when games are organized.

Child moves away from group during group activity, as singing or sharing time.

III. SHARING AND HELPING

Sharing and contributing ideas and interests with other children or teacher:

Child picks up and returns dropped paper to teacher or other child.
Child finds a caterpillar and quickly reports "Come and see what I found."

Two children carry table from one place to another.

Helping another child button coat.

One child says to another, "I'll hold it up so that you can cut it."

IV. RESPONDING TO INTERNAL STIMULI

Child pays practically no attention to either teacher or peers; behavior may consist of daydreaming, gazing off into the distance, appearing not to be fully awake.

Child seems more in touch with his own internal stimuli than with his environment and is detached from the ongoing activity.

Child talks or sings to himself, makes noises for his own enjoyment while doing nothing else, taps fingers, rocks back and forth, walks restlessly about.

V. SOCIAL INTERACTION

Mutual give and take is present in activities.

Two-way conversations, children talking together while waiting in line or during an activity.

Children walking holding hands or with arms around each other.

Child talking with teacher or other children, communicating together.

VI. OBSERVING PASSIVELY

Watching passively without great interest.

Child may be watching teacher but also keeping tabs on the activities of other children or glancing out the window.

Child is easily diverted from his activities or from observing by unexpected events.

Child looks up when a parent enters the room and watches parent.

Child shifts observing from ongoing activity to the wall to another object to another child, etc., in a short period of time.

VII. SEEKING SUPPORT, ASSISTANCE, AND INFORMATION

Seeking help, support, from teachers or peers:

Child asks, "How can I fix this?"

"Please tie my shoe."

"Would you keep this for me?"

Child asks questions - not to initiate conversation but merely for information:

"Are we going to the library today?"

"How long before lunch?"

Child seeks attention and support through showing work or through performance.

"Look at my picture."

"Watch how fast I can run."

VIII. CONFORMING TO EXPECTATIONS

Doing the assigned work without great interest or enthusiasm.

Submitting to requests of teacher or domineering peer.

Following directions without deviation.

Sitting quietly when work is finished.

Waiting for instructions, showing little or no self-directed activity.

IX. SELF-DIRECTED ACTIVITY

Working on productive activity or project with apparent genuine interest:

Molding shapes of play dough, swinging, string beads, coloring, etc.

Problem-solving activities: working on a puzzle, stacking blocks.

Egocentric behavior and language: "I'm going to make a pie."

X. AGGRESSIVE OR NEGATIVE BEHAVIOR

Direct attack, name-calling, physical pushing or hitting:

"Get off! I want to ride now."

Grabbing objects from other children, damaging another child's work or belongings.

Throwing objects around the room or at another, dumping blocks on floor.

Annoying others, poking them, pulling on their clothes or hair.

Demanding attention through whining, yelling, running around, using baby talk.

Criticizing others: "Your painting is sloppy."

XI. DIRECTING AND MANIPULATING OTHERS

Manipulating teacher or other children so they will do what the child wants them to do:

"Go and get me another piece of paper."

"Hold this for me while I go for a drink."

Bossing or commanding others:

"Get in line!"

"Don't do that!"

Enforcing rules in teacher's absence: "You only get one straw!"

Put the rest back."

Threatening to get own way: "I won't play unless we do it my way."

XII. PAYING RAPT ATTENTION

Listening attentively and with interest.

During story telling, while teacher gives direction, records.

Watching an insect, a train go by, or teacher demonstration intently.

Humming or tapping or swaying to environmental stimuli, such as a record.

Not easily distracted by peripheral movement or noise.

Description of the experience or activity.

Name of child	category	I RESISTING AUTHORITY	II WITHDRAWAL	III SHARING & HELPING	IV INTERNAL STIMULI	V SOCIAL INTERACTION	VI OBSERVING PASSIVELY	VII SEEKING SUPPORT	VIII CONFORMING	IX SELF-DIRECTED ACTIVITY	X AGGRESSIVE OR NEGATIVE	XI BOSSY MANIPULATING	XII PAYING RAPT ATTENTION
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													
17.													
18.													
19.													
TOTALS													

school

date

observer

ON ASSESSING SELF-CONCEPT IN YOUNG DISADVANTAGED CHILDREN

In a brief search of the literature, a number of methods can be found which give some information about self-concept in children. Most of these techniques are research oriented and usually require 1:1 teacher-child conferences in testing situations. Others utilize special pictures, drawing tests, or other technical devices.

For the teacher in the classroom, such techniques have limited use. They usually require too much time and special training and analysis. There are however, practical and useful ways of assessing self-concept in the daily routine of the classroom.

I. Louise Bates Ames¹ described the use of a selective technique in which data is gathered by observation. Two possible applications of this method are:

- A. One of the adults in the room listens to a child's talking and writes only those statements which appear to relate to his sense of self, adequacy, and self-concept. Brief notes of interpretation or inference by the teacher are also written as possible explanation. This listening should be balanced between child-child talking and child-teacher talking and is best done during informal times of the day.

These statements by the child should be dated and the situation briefly described. An example of this type of report:

Tuesday Feb. 21 John Jones, talking with 3 other children.

"... and I can draw a lot better than you."

"... teacher likes my pictures, don't you?"

"See how pretty mine is! It is the best one."

¹Louise Bates Ames, "The Sense of Self of Nursery School Children as Manifested by Their Verbal Behavior," Journal of Genetic Psychology, LXXXI (December, 1952), 193-232.

Remarks: John seemed confident that he was doing the best work at first, but he seemed to be seeking approval. I think there is a slight feeling of insecurity revealed here.

observer

- B. Another way to do this is to listen for children's remarks which may relate to self-concept and perception during the ongoing classroom activity, and make anecdotal notes when it is convenient. For example:

Tuesday Feb. 21

John Jones during balance beam activity

John was very unsure of himself and asked me to hold his hand on the first try. He would not try it alone and went away when the others coaxed him. I think he was worried about failure in the eyes of the other children.

observer

Information like this has little immediate use, but can give a helpful guide if trends or patterns appear. As the successive observations (perhaps 1-2 per week) are made and filed, occasional review of these can indicate progress or regression. Indicators of adequacy or inadequacy, competence or incompetence may show up. Persistent negative remarks about one's self would, of course, bring the teacher to plan specific success experiences and special attention to remedy the situation.

II. Wattenburg and Clifford² have used small-group periods to record children's talking as it relates to their self-concept. This is a more structured approach and is useful in eliciting information for use in evaluation and planning future activity. The adult listening again takes note of only remarks which seem to reveal self-perceptions of the child.

²W. W. Wattenburg and Clare Clifford, "Self Concept," Child Development, XXXV, No. 2 (June, 1964).

Several possibilities arise from this method:

- A. Ask one or several children to draw a picture of themselves or their family and make notes if they talk about themselves or relationships with their family. As with the others, select and write only those comments relevant to the self-concept. Such recording would be done periodically, perhaps once every month. The remarks could be rated as being either "positive," "neutral," or "negative." The appearance of strongly positive or negative comments would then assist in understanding him and in planning school experiences for him.
- B. A series of open-ended sentences may also serve to elicit self-reference from a small group of children which could be written and interpreted. Statements like:
 1. I am happiest when . . .
 2. People like me because . . .
 3. One thing I don't like to do is . . . Why not?

could bring about significant comments about the child. These would be periodically reviewed, along with any inference or comment by the teacher pertinent to self-concept.

III. J. H. Meyerowitz³ used pairs of stick figures on a kind of answer sheet, and teachers read a pair of descriptive sentences. The child is asked to choose the one most like himself, and these choices are reflections of how he sees himself at that time.

Of the sentence pairs, one describes a socially desirable child and the other describes either a child with neutral character or a child with socially undesirable characteristics. These are alternated throughout the scoring sheet. (A copy of some sentence pairs modified from the original is attached.)

Scoring is by counting the desirable (+), neutral (0), and undesirable (-) choices and comparing scores every month.

³J. H. Meyerowitz, "Self-Derogations in Young Retardates and Special Class Placement," Child Development, XXXIII, No. 2 (June, 1962).

Groups of five children were found to be best when administering this instrument and pre-schoolers could respond successfully. With this technique, as with the others, the information is useful in comparison and to guide the teacher while planning specifically for that child.

Techniques like these have both considerable value and strong limitation. The value is in the systematic appraisal of particular children for guidance and planning; the limitation is that the information is subjective and fits only a particular situation.

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SAMPLE SENTENCE PAIRS FOR FEEDBACK FORM E3key

- neg. 1. The mother of the child with the square does not miss
A. him when he is in school.
- neut. 2. The mother of the child with the circle washes dishes.
- neg. 1. There are many things that the child with the square
B. does not know.
- pos. 2. The child with the circle is smart.
- neut. 1. The child with the square likes to play with toys.
C.
- neg. 2. The mother and father of the child with the circle
wish he could do better.
- neg. 1. The mother of the child with the square does not love him.
D.
- pos. 2. The mother of the child with the circle is always happy to
see him.
- neg. 1. Children often make the child with the square cry.
E.
- pos. 2. The child with the circle has fun with other children.
- pos. 1. The child with the square likes his teacher.
F.
- neg. 2. The child with the circle does not like his teacher.
- neg. 1. The child with the square is not the same as other children.
G.
- pos. 2. Everyone likes the child with the circle.
- neut. 1. The child with the square can walk and run.
H.
- neg. 2. The child with the circle does not know how to play games
well.

MAKING AND RECORDING JUDGMENTS ABOUT COGNITIVE STYLE AND INTELLECTUAL DEVELOPMENT

I. Analytic or nonanalytic?

It has been established through research¹ that young children exhibit either analytic or nonanalytic style of thinking when faced with certain situations. Analytic styles would, for example, use the observable characteristics of objects when grouping or discriminating. In making two groups from a square, triangle, and circle, the analytic child will usually group the square with the triangle because of their straight sides. The nonanalytic child, however may group the circle with either the square or the triangle "because the circle is like a ball."

The nonanalytic child brings some relationship from his background to the situation or may add information not observable from the object. The analytic child uses only information gained through the senses and from the situation itself.

When an analytic child talks about an event or object, he will usually separate description from interpretation. For example:

A fire truck came by my house yesterday. It was red and shiny and made a lot of noise. It stopped and the men squirted water on the garage that was burning. Then they went away.

A child exhibiting nonanalytic patterns may report the same event:

A fire truck came by my house yesterday. I have a toy fire truck at home just like it. A garage was burning up and the siren scared me. The men sprayed the fire so it went out.

There are times when analytic thinking is highly desirable, such as science activities or visual discrimination experiences or tasks

¹Jerome Kagan, Howard A. Moss, and Irving E. Sigel, "Psychological Significance of Styles of Conceptualization," Society for the Research in Child Development, Monographs, No. 86, 1963.

which require sequencing skills. But during art or social studies or personal-social talking, the children should interpret and relate background information to the topic or task. Nonanalytic patterns are appropriate here.

Observing

A good time to tune in on the differences between analytic or nonanalytic behaviors would be during sharing periods, child-teacher discussions, or other periods when open discussion takes place.

- A. The first judgment to make is to decide which type of thinking pattern is appropriate to the task at hand.
- B. Then, after watching a child for a short time his behavior should be judged analytic or nonanalytic.

(There are times when this distinction is impossible, but other times when it is strikingly evident.)

If analytic behavior is called for and the child shows nonanalytic patterns, immediate and long-range intervention by the teachers should be planned. Such intervention calls for attention to the observable characteristics of objects or the information evident only from within a given situation.

Recording

The form attached has just one place for recording an observation for each child. During a period of one or two days, teachers keep the form in a convenient place for recording observations. As a child is observed, the appropriate style is checked. Then judgment is made whether the child is or is not thinking in that pattern as described.

The form should be completed on the entire class at least once per two weeks to insure systematic observing and recording.

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COGNITIVE STYLE RECORD FORM

date _____

Analytic style - uses observation and description of actual object or event without regard for relationships with background information or interpretation

Nonanalytic style - brings background information to the situation and/or relates this situation to other experiences

NAMES	APPROPRIATE	OBSERVED	COMMENT
1.	analytic nonanalytic	yes no yes no	
2.	analytic nonanalytic	yes no yes no	
3.	analytic nonanalytic	yes no yes no	
4.	analytic nonanalytic	yes no yes no	
5.	analytic nonanalytic	yes no yes no	
6.	analytic nonanalytic	yes no yes no	
7.	analytic nonanalytic	yes no yes no	
8.	analytic nonanalytic	yes no yes no	
9.	analytic nonanalytic	yes no yes no	
10.	analytic nonanalytic	yes no yes no	
11.	analytic nonanalytic	yes no yes no	
12.	analytic nonanalytic	yes no yes no	
13.	analytic nonanalytic	yes no yes no	
14.	analytic nonanalytic	yes no yes no	
15.	analytic nonanalytic	yes no yes no	
16.	analytic nonanalytic	yes no yes no	
17.	analytic nonanalytic	yes no yes no	
18.	analytic nonanalytic	yes no yes no	
19.	analytic nonanalytic	yes no yes no	
20.	analytic nonanalytic	yes no yes no	

APPENDIX B

TABLE 5

PERCENTAGE OF TALK IN EACH CATEGORY BY SUBJECT, PRETEST AND POSTTEST

SUBJECT	CATEGORY NUMBER																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	0
A1	0.2	15.1	2.3	19.5	0.3	28.4	0.13	0.3	0.0	0.0	0.0	0.0	0.0	0.13	22.9	7.5	0.0	0.0	0.0	3.4
A2	2.7	11.9	8.1	22.9	0.0	2.7	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	25.3	1.1	0.0	0.0	0.0	4.2
B1	0.0	20.4	3.7	17.2	0.0	26.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.2	5.2	0.0	0.0	0.0	4.3
B2	1.6	22.3	9.7	24.4	0.0	4.7	1.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	28.1	5.3	0.0	0.0	0.0	2.6
C1	0.0	6.2	1.7	13.2	0.0	59.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	1.1	0.0	0.2	0.0	2.6
C2	0.0	20.6	2.7	14.9	0.0	14.5	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	22.1	17.6	0.0	0.0	0.0	5.3
D1	0.1	12.2	3.4	21.6	1.1	13.5	0.9	1.4	0.4	0.0	0.0	0.0	0.1	1.1	21.5	20.8	0.0	0.4	0.0	1.6
D2	1.8	14.7	5.1	23.9	1.6	7.6	3.5	1.4	0.4	0.0	0.0	0.0	0.0	2.4	20.4	11.0	0.0	0.4	0.0	6.1
E1	0.0	9.1	2.1	15.0	0.1	35.9	1.4	1.1	0.5	0.0	0.0	0.0	0.0	0.3	13.7	17.0	0.0	0.3	0.0	3.7
E2	2.4	6.5	6.9	17.5	2.1	18.9	1.0	0.0	0.7	0.0	0.0	0.0	0.0	2.8	14.4	18.2	0.0	0.0	0.0	8.6
F1	0.0	7.2	1.8	15.1	1.0	31.6	0.5	0.8	0.0	0.0	0.0	0.0	0.0	1.6	15.9	16.3	0.0	0.8	0.0	7.5
F2	0.6	8.5	7.2	16.7	1.3	23.5	1.9	0.3	0.0	0.0	0.0	0.0	0.3	2.5	16.9	13.2	0.6	1.6	0.0	5.0
G1	0.2	11.6	3.2	25.2	0.2	17.9	4.6	0.2	0.0	0.0	0.0	0.0	0.0	0.2	26.4	6.2	0.0	0.0	0.0	4.2
G2	3.1	11.0	5.6	24.5	1.0	6.7	4.8	0.6	1.0	0.0	0.0	0.0	0.0	1.0	22.7	14.6	0.0	0.6	0.0	3.1
H1	0.2	11.2	5.9	26.5	0.4	15.3	2.4	0.2	0.4	0.0	0.0	0.0	0.0	0.6	24.9	7.7	0.2	0.6	0.0	3.7
H2	2.0	10.7	5.4	24.3	1.8	6.7	3.4	0.8	0.7	0.0	0.0	0.0	0.0	2.2	22.7	14.8	0.1	1.0	0.0	3.3
I1	0.2	12.3	3.6	26.7	1.1	9.8	3.0	0.0	0.2	0.0	0.0	0.0	0.0	1.4	25.6	8.5	0.0	0.4	0.0	7.3
I2	0.9	10.4	5.2	24.1	2.8	6.9	1.7	1.1	0.4	0.0	0.0	0.0	0.0	3.7	22.6	15.0	0.2	1.5	0.0	3.5

TABLE 5 (Continued)

SUBJECT	CATEGORY NUMBER																		
	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	0
J ₁	0.0	10.7	6.9	19.4	0.5	28.8	1.1	2.1	0.0	0.0	0.0	0.5	0.7	18.5	7.3	0.2	0.0	0.0	3.4
J ₂	2.8	17.9	3.1	22.7	0.4	8.1	3.7	0.9	0.3	0.0	0.0	0.2	1.2	20.6	12.7	0.2	0.9	0.0	4.6
K ₁	0.8	9.0	9.6	20.1	0.7	24.1	0.0	1.7	0.2	0.0	0.0	0.8	1.0	20.4	9.5	0.0	0.2	0.0	2.2
K ₂	2.9	19.2	3.6	21.7	0.7	9.9	3.6	1.4	0.4	0.0	0.0	0.4	1.1	22.8	8.2	0.0	1.4	0.0	3.9
L ₁	0.9	13.1	5.0	17.6	0.7	10.2	7.5	1.3	0.9	0.2	0.0	0.5	1.1	20.3	13.6	0.2	0.5	0.0	6.5
L ₂	2.8	17.8	2.8	23.3	0.3	6.8	3.8	0.5	0.3	0.0	0.0	0.0	1.3	19.1	15.8	0.3	0.5	0.0	5.1
M ₁	0.2	14.2	8.6	19.0	0.6	23.7	2.6	0.7	0.9	0.0	0.0	0.4	0.6	18.8	5.8	0.0	0.0	0.0	4.0
M ₂	1.7	13.0	3.1	26.2	0.0	13.8	6.5	2.5	1.4	0.0	0.0	0.0	0.0	22.0	6.2	0.0	0.0	0.0	3.7
N ₁	0.0	4.6	1.7	23.8	0.0	35.1	1.3	1.5	0.2	0.0	0.0	0.0	0.0	22.8	4.2	0.0	0.0	0.0	5.0
N ₂	1.1	7.2	6.9	21.3	0.6	18.8	3.3	2.2	1.4	0.0	0.0	0.0	0.8	18.5	10.8	0.0	0.3	0.0	6.9
O ₁	0.6	13.7	14.0	19.4	0.6	23.6	0.3	1.3	0.0	0.0	0.0	0.0	0.3	15.9	7.3	0.0	0.3	0.0	2.6
O ₂	1.5	10.8	5.2	17.9	0.5	14.5	1.7	0.5	0.5	0.0	0.0	0.3	0.5	14.9	22.6	0.0	0.0	0.0	8.8
P ₁	0.2	7.7	3.2	29.5	0.0	12.0	3.4	3.0	0.2	0.0	0.0	0.3	0.7	31.1	4.6	0.2	0.7	0.0	3.4
P ₂	1.6	8.6	9.8	25.7	0.3	5.6	1.6	1.6	0.3	0.0	0.0	0.0	0.5	30.6	11.5	0.3	0.0	0.0	2.9
Q ₁	0.0	8.1	1.3	33.6	0.2	6.6	0.4	1.2	0.2	0.0	0.0	0.0	0.3	40.5	2.1	0.0	0.0	0.0	5.7
Q ₂	2.5	6.2	4.0	20.0	0.3	7.4	0.7	0.5	0.3	0.0	0.0	0.0	0.3	34.4	10.6	0.0	0.0	0.0	5.0
R ₁	0.2	12.1	5.9	26.4	0.4	4.3	2.1	0.5	0.2	0.0	0.0	0.0	0.5	33.5	7.8	0.0	0.7	0.0	5.5
R ₂	2.1	7.3	6.3	26.9	0.3	6.6	1.2	1.0	0.3	0.0	0.0	0.0	0.4	32.7	11.1	0.1	0.0	0.0	4.0
S ₁	0.0	9.0	1.2	22.5	0.0	29.0	2.1	1.2	0.2	0.0	0.0	0.0	0.0	25.8	6.2	0.2	0.2	0.0	2.5
S ₂	2.8	6.0	7.6	24.6	0.8	16.9	2.4	0.0	0.8	0.0	0.0	0.0	0.8	22.9	14.1	0.0	0.0	0.0	2.8

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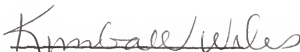
BIOGRAPHICAL SKETCH

Jerold Paul Bauch was born in Ashland, Wisconsin, August 13, 1936. His elementary and secondary school years were spent in Mellen, Wisconsin, where he graduated in 1954. The next step in his education was concluded in 1958, when he graduated from Wisconsin State University at Superior, Wisconsin. He was awarded a Bachelor of Science degree with majors in Biology and Geology. He met and married Shirlene Anderson, of Ashland, Wisconsin.

Between 1958 and 1963, Mr. Bauch served as science teacher in junior high schools in Racine, Wisconsin. The last year of that period was spent as Acting Science Consultant for the Racine Unified School District. Graduate work was begun in 1963, when he entered the University of Florida and completed the requirements for a Master of Education degree with a major in Science Education. The Bauchs returned to Racine for the 1964-1965 school year. Mr. Bauch then continued work toward an advanced degree at the University of Florida in 1965 in the Division of Curriculum and Instruction.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

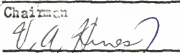
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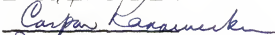

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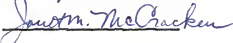
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